

EPA Region 5 Records Ctr.



247987

EXTENT OF CONTAMINATION REPORT  
DAVID CHEMICAL  
CHICAGO, COOK COUNTY, ILLINOIS  
TDD: T05-9410-138  
PAN: EIL0838FBA

August 18, 1995

Prepared for:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
EMERGENCY AND ENFORCEMENT RESPONSE BRANCH

77 West Jackson Boulevard  
Chicago, Illinois 60604

Prepared by: *Karen Rydzewski* Date: 8/18/95  
for Mike C. Mangini, TAT Project Manager

Reviewed by: *Barbara Critchlow* Date: 8/18/95  
for Mary J. Ripp, TAT QA Reports Manager

Approved by: *Tom Kouris* Date: 8/18/95  
for Tom Kouris, TAT Leader



**ecology and environment, inc.**

111 WEST JACKSON BLVD., CHICAGO, ILLINOIS 60604, TEL. 312-663-9415

International Specialists in the Environment

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## **1. INTRODUCTION**

On October 1, 1994, the United States Environmental Protection Agency (U.S. EPA) assigned the Ecology and Environment, Inc. (E & E), Technical Assistance Team (TAT) to assist with removal activities at the David Chemical (DC) site in Chicago, Illinois, under Technical Direction Document (TDD) T05-9410-138. TAT was tasked to prepare a safety plan, provide air monitoring, perform multimedia sampling, provide hazardous categorization of materials on site, complete Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) paperwork, develop an extent of contamination sampling plan, and provide photodocumentation of site activities.

U.S. EPA On-Scene Coordinator (OSC) Peter Guria requested that TAT draft a report to summarize the Extent of Contamination (EOC) sampling activities and analytical results obtained from the investigation, which took place from February 8 to February 17, 1995. This report is submitted in accordance with the OSC's request.

## **2. PROJECT DESCRIPTION**

### **2.1 SITE LOCATION/BACKGROUND INFORMATION**

The DC site is a former chemical storage facility located at 4650 Fifth Avenue in Chicago, Cook County, Illinois (Figure 2-1). The DC site is situated in a mixed residential and light industrial area with Fifth Avenue defining the site's southern boundary, a drum distribution facility, Joe's Drum, the eastern boundary, a gravel alley the northern boundary, and Kilpatrick Avenue the western boundary of the site (Figure 2-2).

According to the owner of the site, manufacturing operations began in 1986. Cleaning agents and detergents were produced at the DC site for sale and distribution to plating facilities, automated car wash facilities, and portable toilet companies. Proprietary waste chromic acid along with other strong acids and bases were used in the cleaning agent manufacturing process.

U.S. EPA Emergency and Enforcement Response Branch (EERB) conducted a removal at the DC site beginning on October 18, 1994. As part of the removal investigation, sampling activities were needed to determine whether contaminants had migrated off site.

### **2.2 PROJECT OBJECTIVES**

The primary objective of the sampling event was to determine the lateral and vertical extent and concentration of chromium and other priority pollutant compounds found in the DC building floors, walls, and soil underlying and surrounding the site. The information obtained from the sampling event and presented in this report will be used by U.S. EPA to determine whether the building and the surrounding soils pose ingestion, inhalation, direct contact, and/or environmental migration threats. The study also provides the location and approximate volume of contaminated soils near the building above U.S. EPA removal action levels.

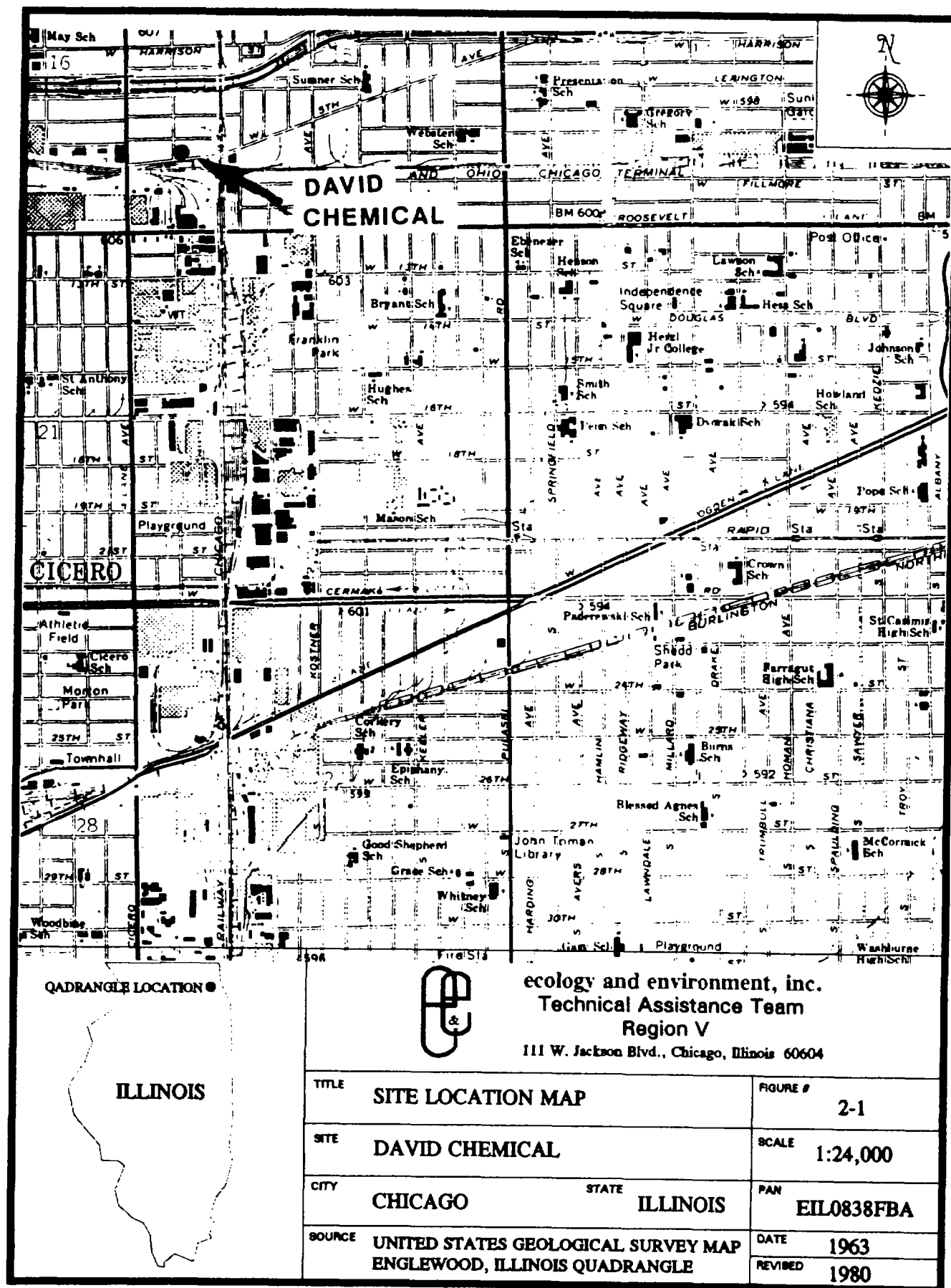
### **2.2.1 Scope of the Project**

A 20-foot by 20-foot grid pattern was marked in the interior of the building on February 8, 1995. On February 9, 1995, 20 concrete borings were collected from the center of each cell of the grid. A total of 102 soil samples were collected from February 14 to 17, 1995, from 34 locations. Sixty of the 102 samples collected were from the interior of the building, and the remaining 42 were collected from the properties directly south, west, and north of the building. Concrete borings were collected using a water-cooled concrete coring machine with a 3-inch-diameter diamond bit. Soil samples were collected with a truck-mounted Geoprobe. The Geoprobe hydraulically drove a 1-inch-diameter stainless steel device into the soil beneath the building through the openings created during the concrete core sampling activities. Samples were collected by TAT with the assistance of the Emergency Response Cleanup Services (ERCS) contractor, Smith Riedel Environmental Services (RES), through their team subcontractor Environmental Science and Engineering, Inc. (ESE). Samples were documented and logged by TAT as they were received from the ERCS boring team. All soil samples underwent field screening for chromium and volatile organic compounds (VOCs). Of the 102 samples collected, 44 samples were sent to the Quanterra Environmental Services, of North Canton, Ohio, for Quality Assurance/Quality Control (QA/QC) verification of field-screening results.

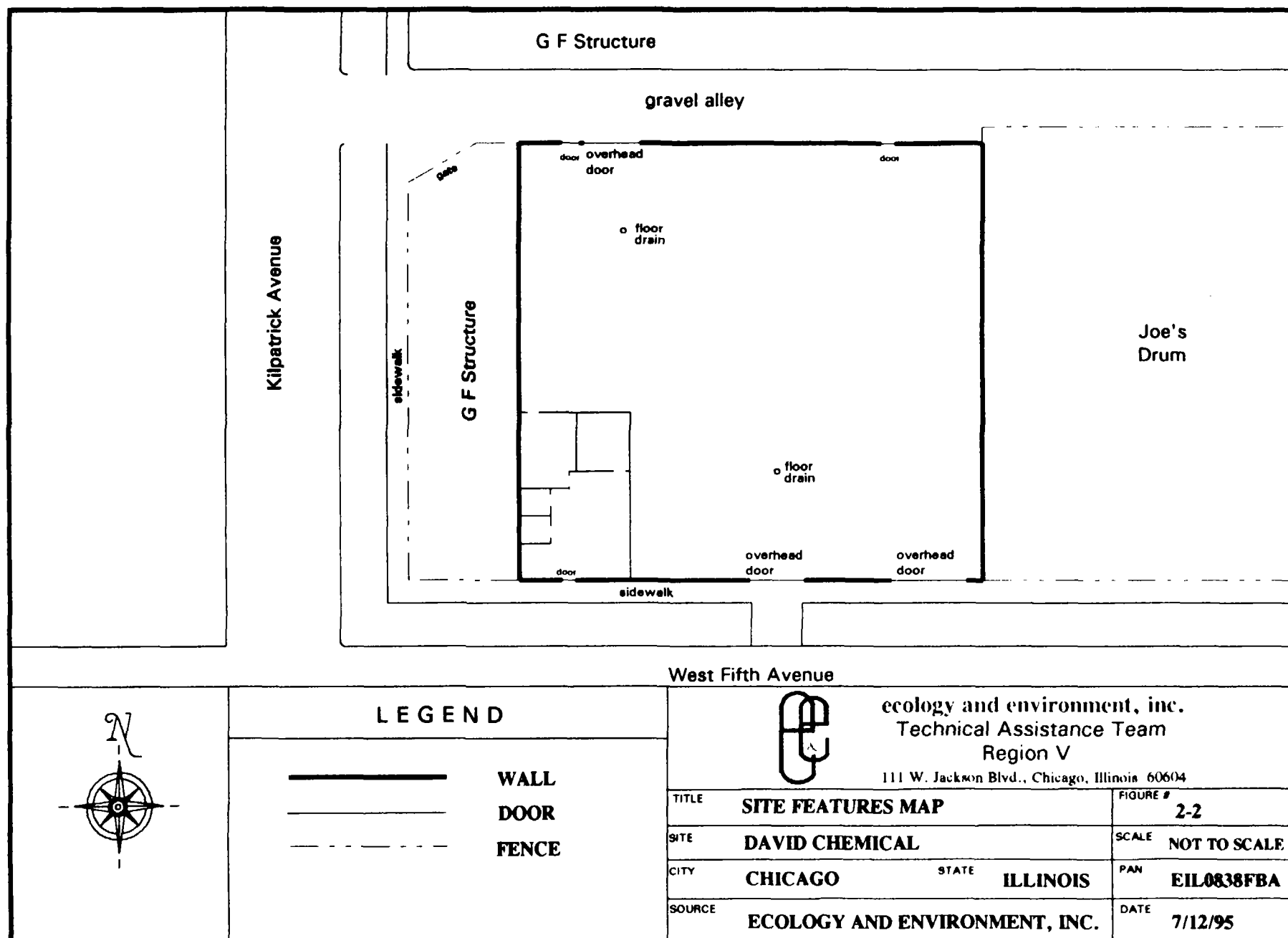
At the request of OSC Guria, TAT sampled two areas in the building where concrete masonry blocks were visibly stained. These samples were collected using a hammer and chisel that were decontaminated with an Alconox and distilled water solution prior to sampling at each of the sampling locations. The masonry samples were shipped to National Environmental Testing, Inc. (NET), of Bartlett, Illinois, under Analytical TDD T05-9503-809.

### **2.2.2 Target Compounds/Matrices**

The potential for soil and concrete contamination was reportedly due to numerous spills and improper storage of the chemicals on site. The spilled material had the potential to contaminate soils by seeping through cracks in the concrete floor, migrating directly through areas where concrete was missing, or entering through floor drains which may have leaked. Chromium was the main contaminant of concern on the site because the majority of waste on site was drummed chromic acid; however, additional wastes which were disposed of during the U.S. EPA removal activities included lead, nickel, cyanide, VOCs, and semivolatile organic compounds.







### **3. SAMPLING PROCEDURES**

#### **3.1 DOCUMENTATION OF SAMPLING LOCATIONS**

Sample location points were established during concrete boring operations at the centers of each 20-foot by 20-foot cell inside the building and at evenly spaced intervals outside the building. All sample locations are indicated on the sample location map (Figure 3-1). Samples were designated as follows: the first two letters of the sample designation represent the site, DC; the next letter represents the type of sample, C for core and S for soil; the next letter and following number represent the grid location; and the numbers in parentheses represent the depth in feet at which the sample was collected. For example, in sample designation DCSB3(1-3), DC signifies the David Chemical site, S means soil sample, B3 is the grid location, and (1-3) shows that the sample was collected from the 1- to 3-foot interval.

#### **3.2 SAMPLE CONTAINERS AND PRESERVATION TECHNIQUES**

Contaminant-free sample containers were provided by the laboratory for all sample media that were collected. Sample container volumes were specified by the laboratory. The outside of the sample containers was decontaminated with distilled water.

Samples for chromate field screening were collected into a stainless steel consolidation bowl, homogenized, and then placed into plastic bags. Although plastic bags can contribute to organic content, possibly contaminating samples with phthalates, they do not affect the chromate screening process. Please note that flame ionization field screening was not performed on bagged material, only on samples within glass jars that had not been homogenized.

All samples were preserved according to the specific method requirements as appropriate. Soil samples were kept chilled to 4 degrees Celsius (°C) prior to analysis. Further, the samples were extracted and analyzed within the required holding times.

### **3.3 FIELD SCREENING**

Field screening was conducted on each sample for chromium, using a Hach brand soil extraction chromium test kit. Approximately 100 grams of each soil sample was placed into plastic bags. The proper amount of soil, 20 grams, was added to a digesting agent and agitated for 15 minutes to achieve an extraction solution that was then tested for chromium concentration. A reagent was allowed to react with the extraction solution to produce a color change. Results were determined using a standardized color wheel. Detectable concentrations ranged from 0.5 to 15,000 parts per million (ppm) in soils. Chromium screening results are presented in Table 3-1. The data acquired from this field screening test were confirmed by sending a limited number of samples to Quanterra Environmental Services for analysis.

Screening for VOCs was performed using a Foxboro flame ionization detector (FID). FID screening was conducted by TAT as the analytical sample was being prepared from the collection sleeve. The FID was used to screen samples as the soils were cut from the acetate sleeves. No significantly high readings above background were encountered during FID screening.

### **3.4 SAMPLE HANDLING, PACKAGING, AND SHIPMENT**

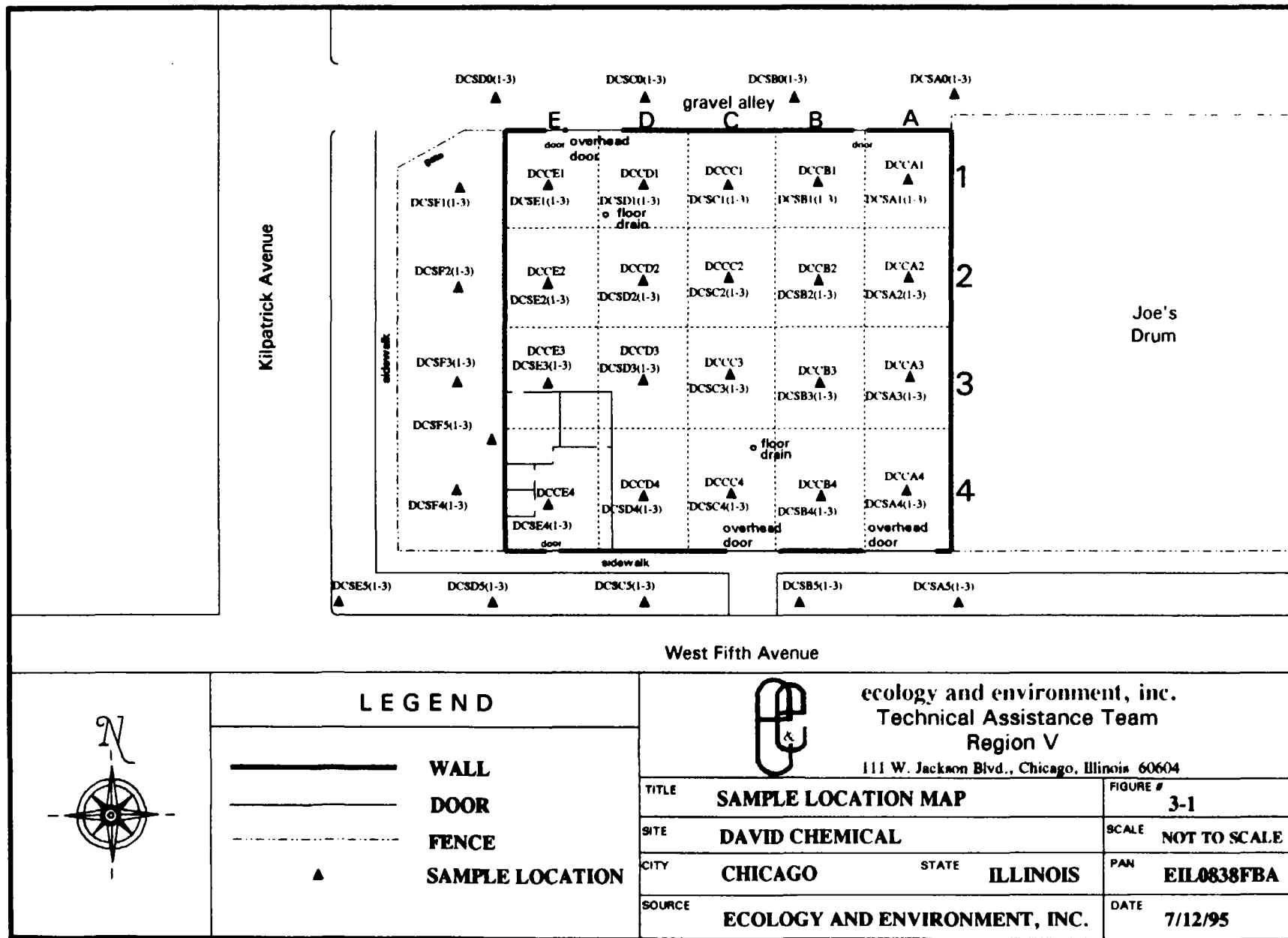
During sampling activities, all reusable equipment (including probes, stainless steel consolidation bowls, spoons, hook knives) was scrubbed with a soft bristled brush and low-foaming alkaline detergent, triple-rinsed with deionized water, and steam-washed before each use.

Following sampling, the sample bottles were sealed and labeled. The bottles were placed in individual plastic bags. The containers were overpacked in a cooler with 2 inches of vermiculite and maintained at approximately 4°C with ice. Sample chain of custody was maintained at all times. All shipping coolers were sealed with two custody stickers.

### **3.5 ANALYTICAL SERVICES**

Analytical services were performed on the QA/QC soil samples, used for verification of field screening, by Quanterra Environmental Services. The facility performed testing for Total Metals, Toxicity Characteristic Leaching Procedure (TCLP) metals, TCLP volatiles, TCLP semivolatiles, total and reactive cyanides, and total and reactive sulfides. Of the 102 samples that were field-screened, 44 samples were sent for QA/QC validation.

Analytical services for the masonry samples were provided by NET Laboratory. All data were reviewed by TAT Chemist Yvette Anderson and found to meet QA/QC Level II specifications.



## **4. SAMPLING RESULTS**

### **4.1 CONCRETE CORE SAMPLE RESULTS**

All 20 concrete cores collected from the interior of the DC building were sent off site to *Quanterra Environmental Services* for total Resource Conservation and Recovery Act (RCRA) priority pollutant metals, TCLP RCRA metals, total and reactive cyanide, and total and reactive sulfide. Laboratory analysis revealed that chromium was present in the concrete samples at concentrations as high as 18,400 ppm total, and 16.5 ppm TCLP (Table 4-1, Figure 4-1). Total lead was encountered at concentrations as high as 317 ppm; however, chromium was the only contaminant found in concentrations that exceeded RCRA Characteristic Waste standards.

### **4.2 SOIL SAMPLE RESULTS**

#### **4.2.1 Chromium Screening Results**

Screening for hexavalent chromium using the Hach brand test kit for soil samples collected during Geoprobe sampling indicated levels of hexavalent chromium from non-detect to 4,000 ppm in the 0- to 2-foot layer; non-detect to 75 ppm in the 2- to 4-foot layer; and non-detect to 16 ppm in the 4- to 6-foot layer (Table 4-2, Figures 4-2, 4-3, and 4-4, respectively).

#### **4.2.2 Analytical Results**

Forty-four of the 102 soil samples collected for chromium screening were sent to the *Quanterra Environmental Services* for total RCRA priority pollutant metals, TCLP RCRA metals, total and reactive cyanide, and total and reactive sulfide analyses. Results from the contract laboratory revealed total chromium concentrations from 9.3 to 864 ppm, and TCLP chromium concentrations as high as 11.1 ppm. Three of the laboratory samples indicated TCLP chromium in excess of the 5-ppm regulatory limit (Table 4-3). *Quanterra Environmental Services* data summaries are included in the OSC Appendices files.

### **4.3 CONCRETE MASONRY SAMPLE RESULTS**

Two concrete masonry samples that showed visual evidence of chromium contamination were collected by TAT on March 21, 1995, and sent to the NET Laboratory for total and TCLP chromium analyses. Analysis of sample W1, collected from the wall between the "kitchen" and the hazard categorization room, revealed 2,400 ppm total chromium and 102 ppm TCLP chromium. Sample W2, collected from the east wall of the building, was found to contain 115 ppm total chromium and 4.58 ppm TCLP chromium. The NET Laboratory data package is provided in Appendix A of this report.

<p>Table 4-1</p> <p>CONCRETE CORE CHROMIUM ANALYTICAL RESULTS</p> <p>DAVID CHEMICAL SITE</p> <p>CHICAGO, ILLINOIS</p> <p>(FEBRUARY 1995)</p>		
Sample Number	Total Chromium (ppm)	TCLP Chromium (ppm)
DCCA1	42.9	0.44
DCCA2	18,400	3.8
DCCA3	352	2.5
DCCA4	624	16.5
DCCB1	152	1.1
DCCB2	50.0	0.22
DCCB3	85.9	0.5
DCCB4	125	0.22
DCCC1	7.6	ND
DCCC2	40.7	ND
DCCC3	34.7	0.31
DCCC4	13.7	ND
DCCD1	18.2	ND
DCCD2	203	1.2
DCCD3	170	0.51
DCCD4	80.9	0.50
DCCE1	14.6	ND
DCCE2	19.5	ND
DCCE3	90.2	1.0
DCCE4	152	1.3

Analysis performed by Quanterra Environmental Services, North Canton, OH.

Key:

ppm = parts per million.  
TCLP = Toxicity Characteristic Leaching Procedure.  
ND = Not Detected.

Table 4-2

HEXAVALENT CHROMIUM FIELD-SCREENING RESULTS  
 DAVID CHEMICAL SITE  
 CHICAGO, ILLINOIS  
 (FEBRUARY 1995)

Sample Number	Chromium (ppm)	Sample Number	Chromium (ppm)
A0-1	ND	B3-1	ND
A0-2	ND	B3-2	ND
A0-3	ND	B3-3	ND
A1-1	500	B4-1	ND
A1-2	ND	B4-2	ND
A1-3	0.4	B4-3	ND
A2-1	4.0	B5-1	ND
A2-2	ND	B5-2	ND
A2-3	ND	B5-3	ND
A3-1	4,000	C0-1	ND
A3-2	75	C0-2	ND
A3-3	15	C0-3	ND
A4-1	500	C1-1	14.0
A4-2	4.0	C1-2	ND
A4-3	16.0	C1-3	ND
A5-1	80	C2-1	0.4
A5-2	ND	C2-2	ND
A5-3	ND	C2-3	ND
B0-1	ND	C3-1	ND
B0-2	ND	C3-2	ND
B0-3	ND	C3-3	ND
B1-1	8.0	C4-1	ND
B1-2	ND	C4-2	ND
B1-3	ND	C4-3	ND
B2-1	ND	C5-1	ND
B2-2	ND	C5-2	ND
B2-3	ND	C5-3	ND



Table 4-2 (Cont.)  HEXAVALENT CHROMIUM FIELD-SCREENING RESULTS DAVID CHEMICAL SITE CHICAGO, ILLINOIS (FEBRUARY 1995)			
Sample Number	Chromium (ppm)	Sample Number	Chromium (ppm)
D0-1	ND	E3-1	ND
D0-2	ND	E3-2	ND
D0-3	ND	E3-3	ND
D1-1	ND	E4-1	10
D1-2	ND	E4-2	10
D1-3	ND	E4-3	ND
D2-1	ND	E5-1	ND
D2-2	ND	E5-2	ND
D2-3	ND	E5-3	ND
D3-1	0.4	F1-1	ND
D3-2	ND	F1-2	ND
D3-3	ND	F1-3	ND
D4-1	100	F2-1	ND
D4-2	0.6	F2-2	ND
D4-3	ND	F2-3	ND
D5-1	ND	F3-1	ND
D5-2	ND	F3-2	ND
D5-3	ND	F3-3	ND
E1-1	ND	F4-1	ND
E1-2	ND	F4-2	ND
E1-3	ND	F4-3	ND
E2-1	ND	F5-1	ND
E2-2	ND	F5-2	ND
E2-3	ND	F5-3	ND

All sample field screening was performed using the "Chromium (Hexavalent) in Soil Water" colorimetric test kit.

**Key:**

ND = Not Detected.  
ppm = parts per million.

<p>Table 4-3</p> <p>CHROMIUM ANALYTICAL RESULTS</p> <p>DAVID CHEMICAL SITE</p> <p>CHICAGO, ILLINOIS</p> <p>(FEBRUARY 1995)</p>			
Sample Number	Total Chromium <sup>a</sup> (ppm)	Chromium Screening <sup>b</sup> (ppm)	TCLP Chromium <sup>a</sup> (ppm)
DCSA1-1	412	500	11.1
DCSA2-3	101	ND	ND
DCSA3-2	292	75	3.9
DCSA4-2	155	4.0	ND
DCSA4-3	864	16.0	ND
DCSB3-1	85.5	ND	ND
DCSB3-3	72.2	ND	ND
DCSB4-1	362	ND	ND
DCSB4-3	697	ND	ND
DCSC1-1	362	14	ND
DCSC1-3	30.8	ND	ND
DCSC2-3	21.2	ND	ND
DCSC3-3	33.8	ND	ND
DCSC4-1	164	ND	ND
DCSC4-3	46.6	ND	ND
DCSD3-3	24.2	ND	ND
DCSD4-2	52.0	0.6	0.11
DCSE4-3	423	ND	6.2
DCSE4-3D	491	ND	10.4
DCSA5-1	75.6	80	ND
DCSA5-1D	45.3	80	ND
DCSA5-2	27.4	ND	ND
DCSB5-1	44.9	ND	ND
DCSB5-3	43.8	ND	ND
DCSC5-1	252	ND	ND

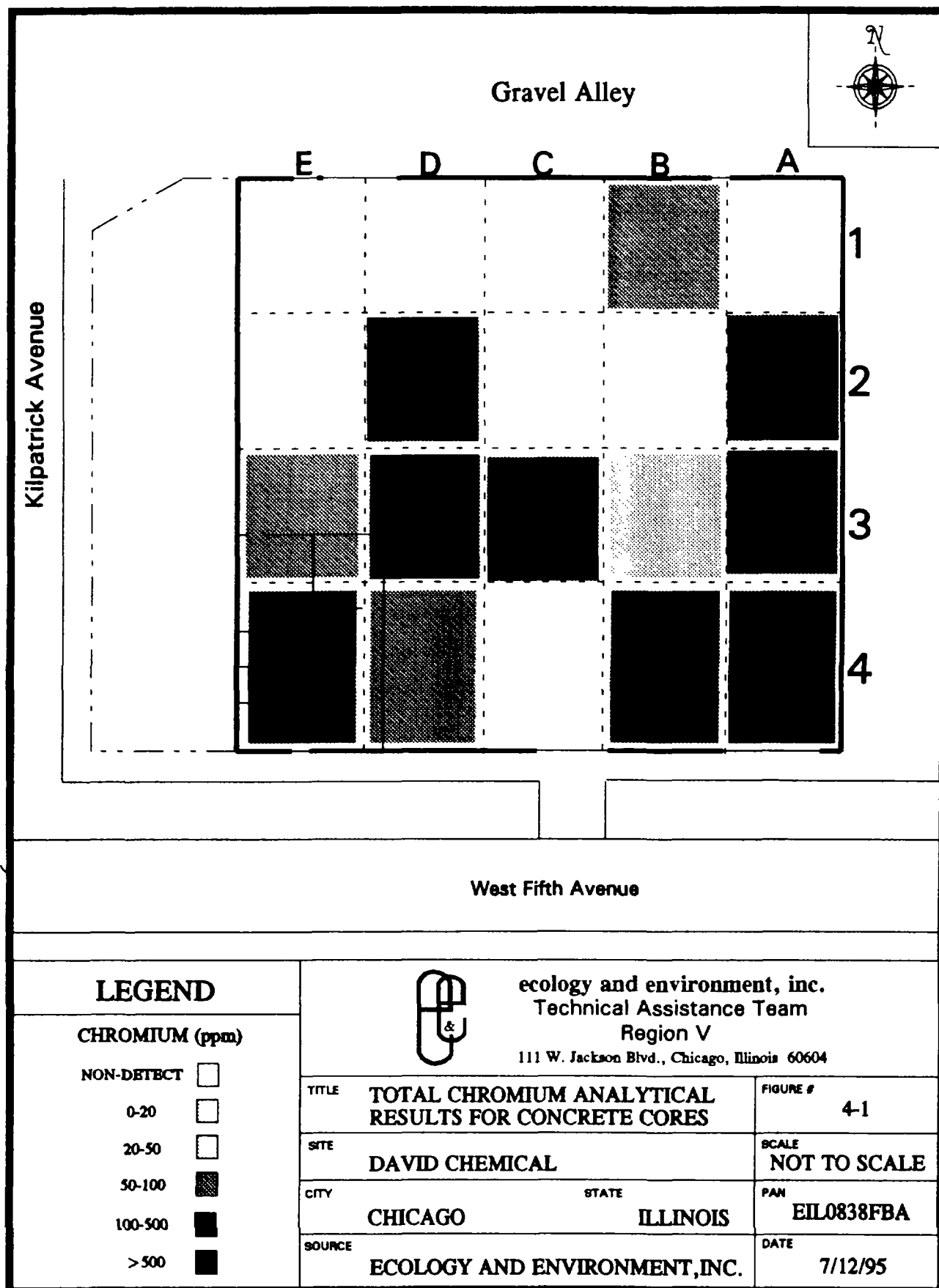
<p>Table 4-3 (Cont.)</p> <p>CHROMIUM ANALYTICAL RESULTS</p> <p>DAVID CHEMICAL SITE</p> <p>CHICAGO, ILLINOIS</p> <p>(FEBRUARY 1995)</p>			
Sample Number	Total Chromium <sup>a</sup> (ppm)	Chromium Screening <sup>b</sup> (ppm)	TCLP Chromium <sup>a</sup> (ppm)
DCSC5-3	29.8	ND	ND
DCSD5-2	28.6	ND	ND
DCSE5-2	24.4	ND	ND
DCSE5-3	23.6	ND	ND
DCSA0-1	52.8	ND	ND
DCSA0-1D	82.8	ND	ND
DCSC0-2	25.8	ND	ND
DCSD0-1	23.6	ND	ND
DCSD0-3	16.4	ND	ND
DCSF1-1	22.5	ND	ND
DCSF2-1	16.0	ND	ND
DCSF2-3	26.2	ND	ND
DCSF3-1	19.1	ND	ND
DCSF3-3	24.2	ND	ND
DCSF4-1	9.3	ND	ND
DCSF4-3	26.2	ND	ND
DSCF5-1	89.1	ND	ND
DCSF5-1D	44.4	ND	ND
DCSF5-3	59.4	ND	ND

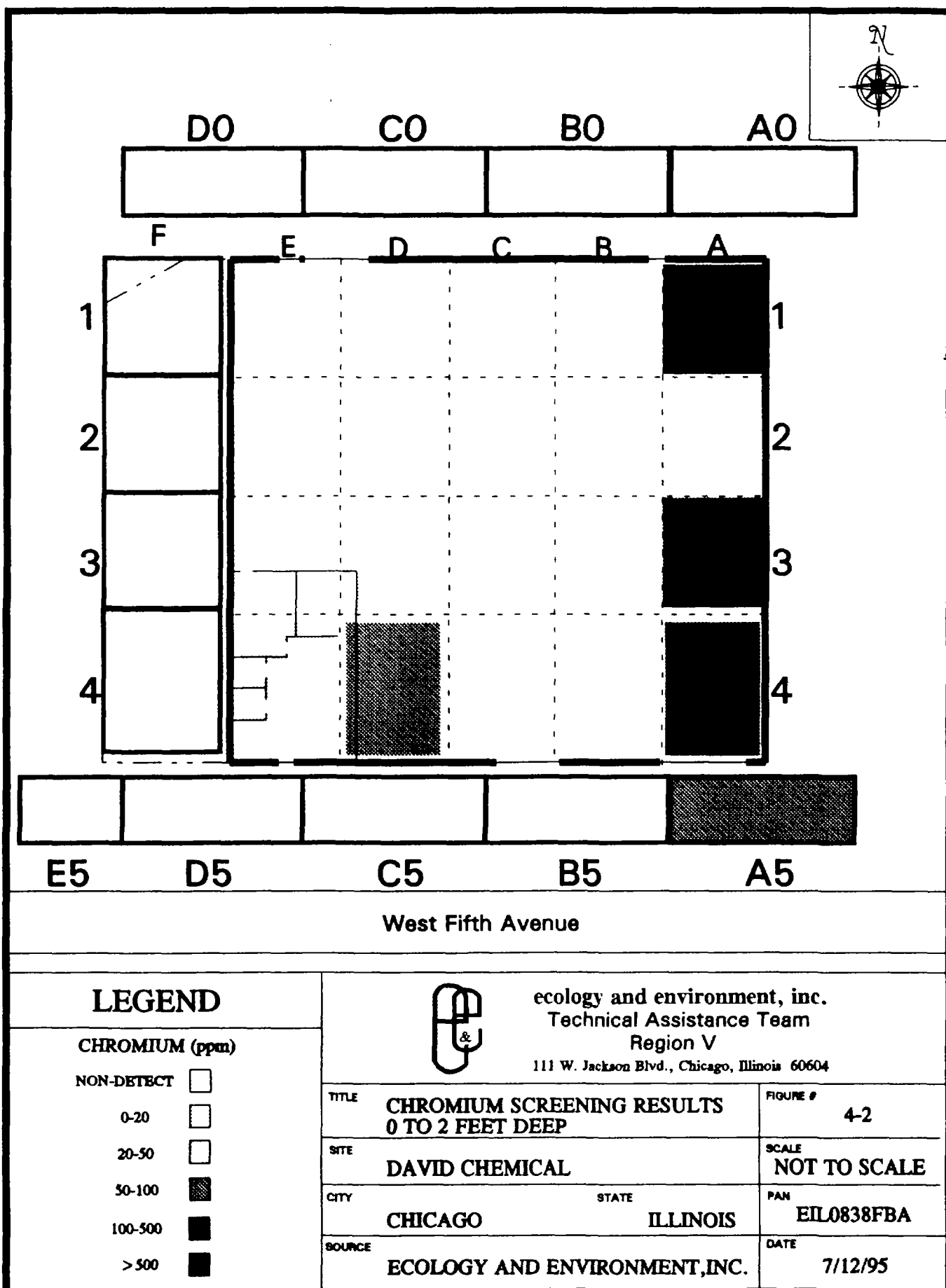
<sup>a</sup> Analysis performed by Quanterra Environmental Services, North Canton, OH.

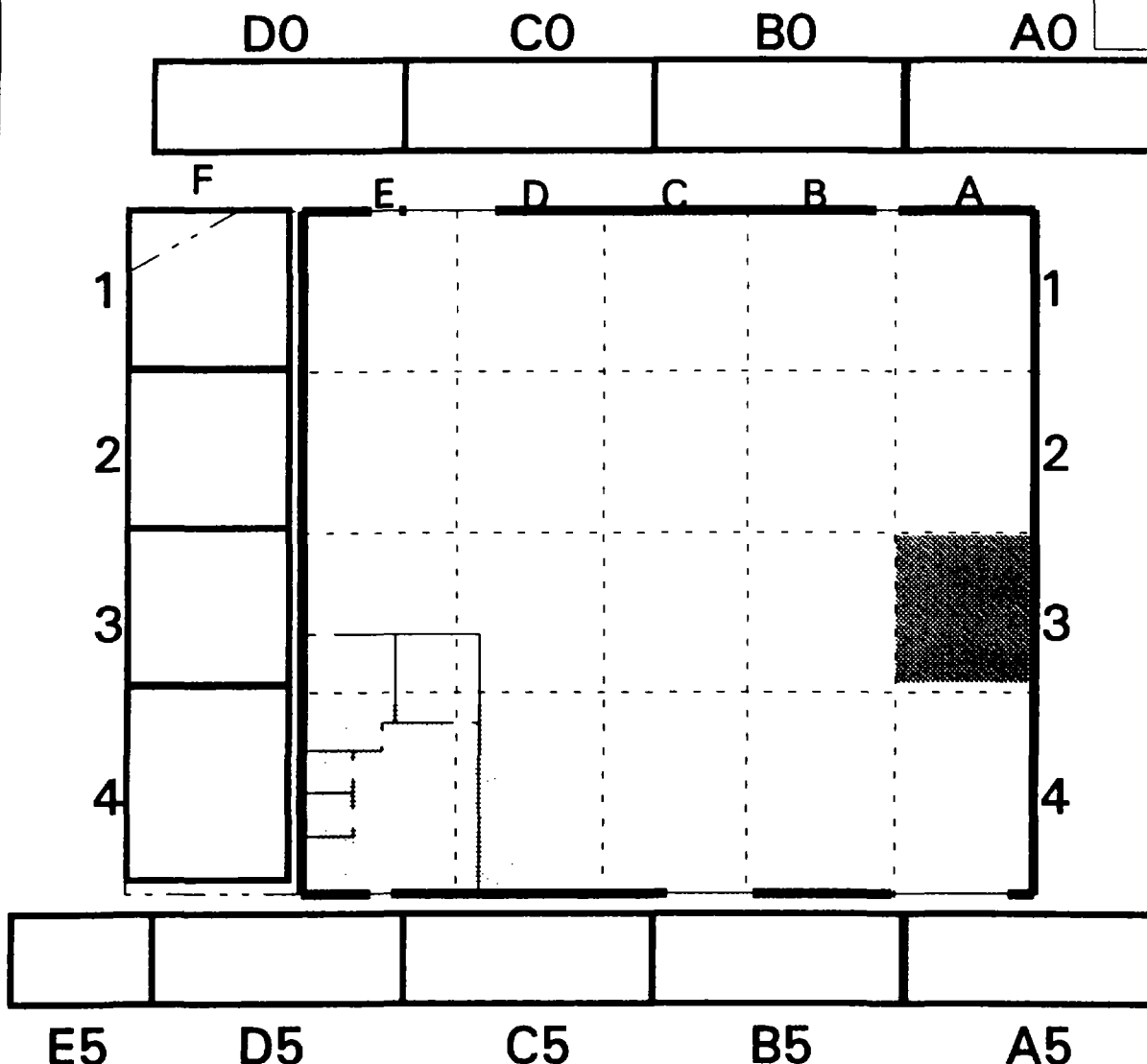
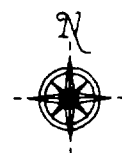
<sup>b</sup> Field screening performed by Ecology and Environment, Inc., TAT using a Hach "Chromium in Soils" test kit.

Key:

ND = Not Detected.  
TCLP = Toxicity Characteristic Leaching Procedure.  
ppm = parts per million.







West Fifth Avenue

## LEGEND

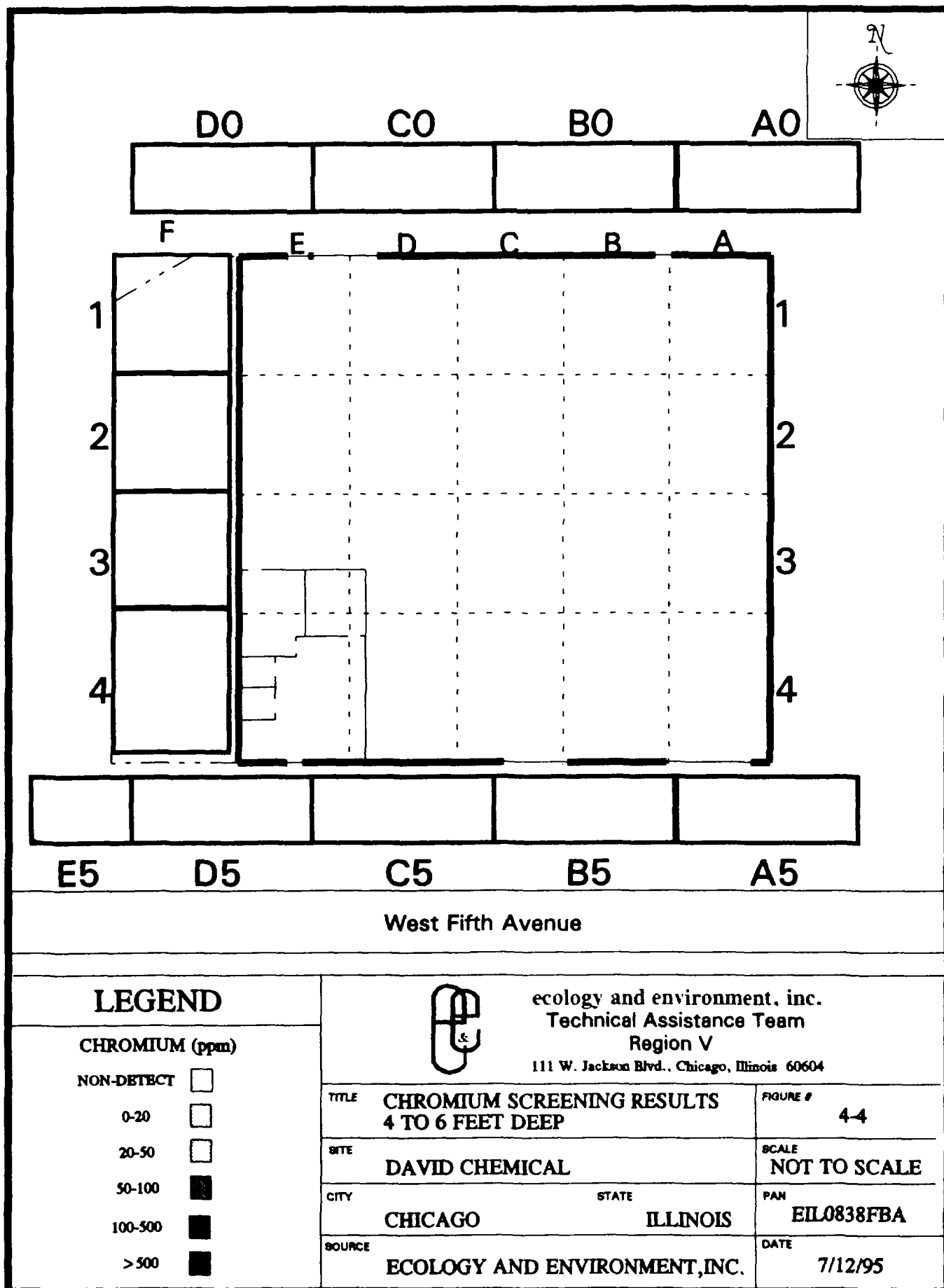
### CHROMIUM (ppm)

NON-DETECT	
0-20	
20-50	
50-100	
100-500	
> 500	



ecology and environment, inc.  
Technical Assistance Team  
Region V  
111 W. Jackson Blvd., Chicago, Illinois 60604

TITLE	CHROMIUM SCREENING RESULTS 2 TO 4 FEET DEEP	FIGURE #	4-3
SITE	DAVID CHEMICAL	SCALE	NOT TO SCALE
CITY	CHICAGO	STATE	ILLINOIS
SOURCE	ECOLOGY AND ENVIRONMENT, INC.	PAN	EIL0838FBA
		DATE	7/12/95



## **5. SUMMARY**

Chromium was found in the building predominantly on the floor and in the underlying soil on the east side of the building; a localized area of high concentration was also found at the southwest exterior corner of the building. Both the concrete floor and the masonry block wall were found to contain TCLP chromium at levels that would classify these materials as characteristic wastes. Based on the results of this study, it is recommended that further cleanup activities be performed at the DC site to remedy the contamination identified in the underlying soils and contaminated building materials.



**APPENDIX A**

**NET LABORATORY DATA PACKAGE**



# ecology and environment, inc.

International Specialists in the Environment

111 West Jackson Boulevard  
Chicago, Illinois 60604  
Tel: (312) 663-9415, Fax: (312) 663-0791

## MEMORANDUM

**DATE:** April 19, 1995

**TO:** Mike Mangini, TAT Project Manager, E & E, Chicago, IL

**FROM:** Yvette Anderson, TAT Chemist, E & E, Chicago, IL *ya*

**THROUGH:** David Hendren, TAT Analytical Services Manager,  
E & E, Chicago, IL  
Mary Jane Ripp, TAT QA Reports Manager, E & E,  
Chicago, IL

**SUBJECT:** Total Chromium Data Quality Review,  
David Chemical, Chicago, Cook County, Illinois

**REFERENCE:** Project TDD T05-9410-138B Analytical TDD T05-9503-809  
Project PAN EIL0838FBA Analytical PAN EIL0838AAA

The data quality assurance (QA) review of two concrete samples collected from the David Chemical site is complete. The samples were collected on March 21, 1995, by the Technical Assistance Team (TAT) contractor, Ecology and Environment, Inc. (E & E). The samples were submitted to NET, Inc., Bartlett, Illinois, for analysis. The laboratory analyses were performed according to the United States Environmental Protection Agency (U.S. EPA) Solid Waste 846 Methods 1311 and 6010.

### Sample Identification

**E & E**  
**Identification No.**

W1  
W2

**Laboratory**  
**Identification No.**

298231  
298232

David Chemical Site  
Project TDD: T05-9410-138B  
Analytical TDD: T05-9503-809  
Page 2

## Data Qualifications

### I. Sample Holding Time: Acceptable

The samples were collected on March 21, 1995, digested on March 29, 1995, and analyzed on March 31, 1995. This is within the 6-month holding time for metal samples.

### II. Calibrations: Acceptable

#### • Initial Calibration:

Calibration results were within the established quality control limits of 90% to 110% of the true value for metals.

#### • Continuing Calibration:

Calibration results met the established control limits of 90% to 110% for metals.

### III. Blanks: Acceptable

A method blank was analyzed with the samples. No target compounds or contaminants were detected in the method blank.

### IV. Interference Check Sample (ICS) Analysis : Acceptable

All parameters were within the (ICS) control limits of 80% to 120% of the true values. An ICS was run at the beginning and end of sample analysis.

### V. Overall Assessment of Data for Use: Acceptable

The overall usefulness of the data is based on criteria for QA Level II outlined in the U.S. EPA Office of Solid Waste and Emergency Response (OSWER) Directive 9360.4-01 (April 1990), Data Validation Procedures, Section 3.0, Metallic Inorganic Parameters. Based upon the information provided, the data are acceptable for use.



NATIONAL  
ENVIRONMENTAL  
TESTING, INC.

Bartlett Division  
850 W. Bartlett Rd.  
Bartlett, IL 60103  
Tel: (708) 289-3100  
Fax: (708) 289-5445

## ANALYTICAL REPORT

Mr. Dave Hendren  
ECOLOGY & ENVIRONMENT, INC  
111 West Jackson Blvd.  
Chicago, IL 60604

04/03/1995

Sample No. : 298231

NET Job No.: 95.01973

Sample Description: W1; Grab  
David Chemical

Date Taken: 03/21/1995  
Time Taken: 09:03  
IEPA Cert. No. 100221

Date Received: 03/27/1995  
Time Received: 16:25  
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
TCLP Metals Extraction	Leached		03/29/1995		kab	331	1311 (1)
Chromium, ICP	2,400	ug/g	04/03/1995	2.0	jmt	360 780	6010 (1)
TCLP-Chromium, ICP	102	mg/L	03/31/1995	0.040	jmt	725 1054	6010 (1)





NATIONAL  
ENVIRONMENTAL  
TESTING, INC.

Bartlett Division  
850 W. Bartlett Rd.  
Bartlett, IL 60103  
Tel: (708) 289-3100  
Fax: (708) 289-5445

## ANALYTICAL REPORT

Mr. Dave Hendren  
ECOLOGY & ENVIRONMENT, INC  
111 West Jackson Blvd.  
Chicago, IL 60604

04/03/1995

Sample No. : 298232

NET Job No.: 95.01973

Sample Description: W2; Grab  
David Chemical

Date Taken: 03/21/1995  
Time Taken: 09:03  
IEPA Cert. No. 100221

Date Received: 03/27/1995  
Time Received: 16:25  
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
TCLP Metals Extraction	Leached		03/29/1995		kab	331	1311 (1)
Chromium, ICP	115	ug/g	04/03/1995	2.0	jmt	360 780	6010 (1)
TCLP-Chromium, ICP	4.58	mg/L	03/31/1995	0.040	jmt	725 1054	6010 (1)

